

NATIONAL SYNCHROTRON LIGHT SOURCE

Development of digital controllers at NSLS

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Applications

- Magnet-power-supply control logic (power supply group, T. Seda).
- Bunch timing (J. Rose).
- DSP-based magnet-power-supply feedforward (P. Zuhoski).
- DSP-based light-source LLRF systems (N. Towne).
- PLD-based light-source LLRF systems (N. Towne).



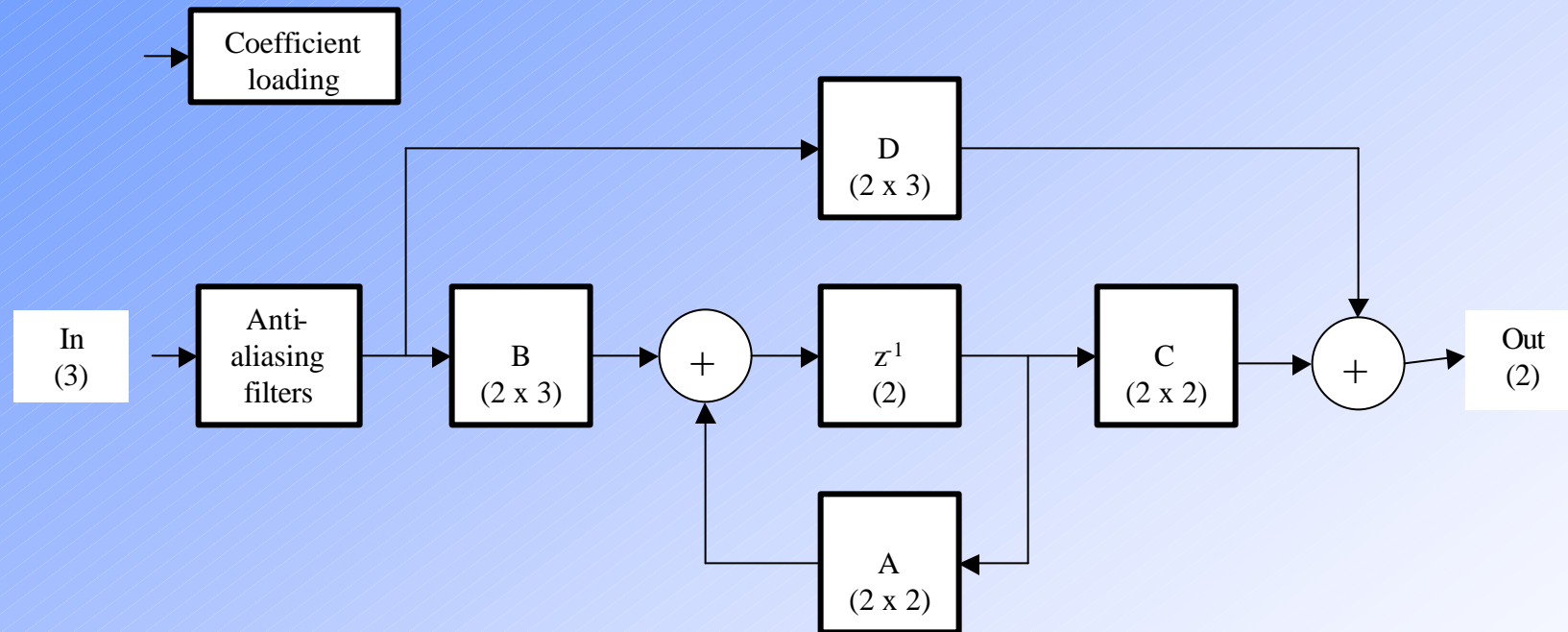
Wish list for PLD-based LLRF-system processor

- IIR state-variable model with three inputs, two outputs, and two internal state variables.
- On-the-fly arbitrarily programmable coefficients.
- Sub-microsecond processing delay and a few hundred kHz repetition rate.
- Anti-aliasing FIR filter via oversampling.
- Suitable (simple) external interface.
- Altera devices – Apex 20k logic family.





PLD-based processor



- A, B, C, and D are m x n multiplier/adder arrays.
- 12-bit input and output data streams.
- ~1- to 10-MHz incoming data rate.
- 14-bit internal data width.